Introduction

The effective treatment of road accidents and thus the enhancement of road safety is a major concern to societies due to the losses in human lives and the economic and social costs. Tremendous efforts have been dedicated by transportation researchers and practitioners to improve road safety. Although various research studies examining road accident severity have been found in international literature, only a few were carried out in Greece (Yannis et al., 2005; Theofilatos et al., 2012). Moreover, previous studies have shown the difference in severities between different types of vehicles. Consequently, the present study aims to contribute to existing knowledge by investigating road accident severity in Greece with particular focus on vehicle type, in order to identify the critical risk factors.

Objectives

The aim of the present study is the investigation of road accident severity per vehicle type. Three expressions of accident severity were examined: i) the number of fatalities divided by the total number of involved vehicles, ii) the number of severe injuries divided by the total number of involved vehicles and iii) the number of slight injuries divided by the total number of involved vehicles. Furthermore, separate accident severity models were developed for each type of vehicle.

Data and Methods

Accident data were collected from the Hellenic Statistical Authority’s database, which includes disaggregate road accident data based on police accident records in Greece. More specifically, a 5-year period was considered for this study, namely from 2004 to 2008. Totally, 59,316 road accidents were recorded and 105,074 injured persons were involved.

<table>
<thead>
<tr>
<th>Vehicle type</th>
<th>Car</th>
<th>Truck</th>
<th>Bus</th>
<th>Moped (&lt;50cc)</th>
<th>Motorcycle (&gt;50cc)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatalities</td>
<td>8.4%</td>
<td>12.7%</td>
<td>3.6%</td>
<td>6.3%</td>
<td>5.3%</td>
</tr>
<tr>
<td>Severe injuries</td>
<td>9.0%</td>
<td>9.9%</td>
<td>5.4%</td>
<td>12.3%</td>
<td>9.8%</td>
</tr>
<tr>
<td>Slight injuries</td>
<td>82.6%</td>
<td>77.4%</td>
<td>91.0%</td>
<td>81.4%</td>
<td>84.9%</td>
</tr>
</tbody>
</table>

The applied method of analysis is the lognormal linear regression. 

\[ \text{Log} y_i = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + ... \beta_i x_{vi} + \varepsilon_i \]

where \( y \) is the dependent variable, \( \beta_0 \) is the beta coefficient of the constant term, \( \beta_1, ..., \beta_i \) are the beta coefficients of the independent variables \( x_{1i}, x_{2i}, ..., x_{vi} \) and \( \varepsilon_i \) is the error term. The subscript \( i \) corresponds to the individual or observation, where \( i = 1, 2, ..., k \). It is noted that since a logarithmic transformation of the dependent variable \( y \) took place, the relationship of independent variables and \( y \) is not linear.

Conclusions

The effect of various parameters, such as crash type and weather conditions on accident severity was identified for each type of vehicle (car, moped, motorcycle, bus and truck). The results of the study can be proved useful for enhancing road safety in Greece. Further research could focus on examining additional parameters such as road geometrical characteristics, traffic parameters such as flows, speeds and so on. Furthermore, different areas and regions in Greece could be explored. In this case, other statistical methods could be explored as well, for example multilevel models.

References